



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/728,490

12/05/2003

Mark T. Anderson

58623US002

9748

32692

7590

04/19/2006

EXAMINER

CHACKO DAVIS, DABORAH

3M INNOVATIVE PROPERTIES COMPANY

PO BOX 33427

ST. PAUL, MN 55133-3427

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/728,490

Applicant(s)

ANDERSON ET AL.

Examiner

Daborah Chacko-Davis

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-38, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent Application Publication No. 2004/0068023 (Leatherdale et al., hereinafter referred to as Leatherdale) in view of U. S. Patent Application Publication No. 2004/0012872 (Fleming et al., hereinafter referred to as Fleming).

Leatherdale, in the abstract, in [0008], [0009], [0010], [0011], [0012], [0013], [0021], [0022], [0024], [0025], [0026], [0027], [0028], and [0031], discloses an exposure process of exposing a photoreactive composition (substantially inorganic) using a multiphoton exposure system, exposing the photoreactive composition by using an exposure beam (multiphoton reactive radiation, pulsed laser) of appropriate wavelength, intensity, spatial distribution such that the exposure beam can be translated into three-dimensional periodic pattern of exposed and unexposed regions (reacted and unreacted portions) on the photoreactive composition, and removing either the exposed or the unexposed region to form a pattern (interstitial voids, in sub-micron dimensions) (claims 1-3, 23, 26, 36, 38). Leatherdale, in [0009], [0010], [0011], [0012], discloses that the photoreactive composition includes a reactive species, a photoinitiator system, and plurality of inorganic particles (claim 4). Leatherdale, in [0004], discloses that after

Art Unit: 1756

exposure and development, the photoreactive composition is pyrolyzed to remove the organic components leaving behind an inorganic structure (loses at least 60% of initial weight) (claims 5, and 37). Leatherdale, in [0036], [0038], [0039], [0046], [0047], discloses that the reactive curable species is organic or hybrid organic/inorganic (claims 6-7). Leatherdale, in [0038], [0039], discloses the inorganic photoreactive compositions recited in claim 8. Leatherdale, in [0036], discloses that the photoinitiator system includes a multi-photon photosensitizer, an electron acceptor, and an electron donor (claims 9-10). Leatherdale, in [0052], discloses that the multi-photon photosensitizer used in the photoreactive composition has a two-photon absorption cross-section greater than that of fluorescein (claims 11, and 12). Leatherdale, in [0061], discloses the multi-photon photosensitizer (exhibits large multi-photon absorption cross-section) in the photoreactive composition is Rhodamine B (claims 13-14). Leatherdale, in [0065], discloses the electron acceptor recited in claim 15. Leatherdale, in [0114], discloses the electron donor recited in claim 16. Leatherdale, in [0143], [0144], and [0145], discloses that the inorganic particles include metal oxide particles such as alumina, silica, zirconia, titania etc., and that the inorganic particles are less than 150nm in diameter (claims 17-21). Leatherdale, in [0150], discloses that the surface of the silica particles (inorganic particles) are treated (Claim 22). Leatherdale, in [0022], discloses exposing the photoreactive composition to a pulse laser (claim 24). Leatherdale, in [0004], and [0024], discloses that the preferred light sources for exposure is an infrared pulsed laser (claim 25). Leatherdale, in [0027], [0028], discloses that the unexposed (or exposed) regions of the photoreactive composition is removed by development (with a solvent,

Art Unit: 1756

chemical etching) (claims 27, and 30-31). Leatherdale, in [0031], [0032], discloses adding (depositing on the void structures formed on the photoreactive composition) inorganic semiconductors (of different refractive indices) including metal oxides to the three-dimensional pyrolyzed structures (claims 28-29, and 32-35).

The difference between the claims and Leatherdale is that Leatherdale does not disclose that the exposure is performed using a multibeam interference technique involving at least three beams.

Fleming, in the abstract, and in [0022], discloses using an optical interference from the three or more light beams to form a three-dimensional pattern of light, and expose the photoreactive composition to the three-dimensional pattern of light.

Therefore, it would be obvious to a skilled artisan to modify Leatherdale by employing the method of using the interference of three or more light beams to perform a three-dimensional light exposure as suggested by Fleming because Fleming in [0064], discloses that the interference of the three beams causes the overlap of pulses to form selected regions of the three-dimensional interference pattern and enables the reaction of different portions of the interference pattern with successive laser pulses.

Response to Arguments

3. Applicant's arguments, see Remarks, filed February 6, 2006, with respect to claims 1-38, have been fully considered and are persuasive. The 102 rejection made in the previous office action (paper no. 0929) has been withdrawn. Applicant's arguments with respect to claims 1-38, have been considered but are moot in view of the new ground(s) of rejection.


A) Applicants argue that Leatherdale et al., does not disclose a multi beam interference technique involving at least three beams.

See paragraph nos. 2, and 3. Fleming is depended upon to disclose the use of a multi-beam interference exposure on photoreactive compositions to form a three-dimensional pattern.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd


April 17, 2006.


JOHN A. MCPHERSON
PRIMARY EXAMINER